

REMARKS

Claims 1-14 were pending prior to entry of this Amendment. In this reply, Claims 13 and 14 have been canceled. Currently Claims 1-12 are pending. Applicant hereby reserves the right to pursue any subject matter which may have been canceled from a prior claim or which may otherwise be described in the application in subsequent filings or continuation applications.

Applicant thanks the Examiner for the thorough and thoughtful consideration of the present application and the art of record.

In the Office Action, the examiner rejected pending Claims 1-14. Further, Claim 13 was rejected under 35 USC 101, as being directed to non-statutory subject matter. In addition, Claims 1-8, 11, and 13 and 14 were rejected under 35 USC 103(a) as being obvious over Sexton, US 6567686 (herein "Sexton"), in light of the Czaja et al. Acoustic Measurement of Subglottic Stenosis; Ann Otol Rhinol Laryngol 105; 1996. (herein "Czaja"). Claim 9 was rejected as being obvious over the Sexton and Czaja references further in view of Stapleton et al, *On the Suitability of e-Turbulence modeling for Aerosol Dispersion on the Mouth and Throat: A comparison with Experiment*; Journal of Aerosol Science, Vol. 31, No. 6, pp739-749 (herein "Stapleton"). Lastly, Claim 10 was rejected as obvious over Sexton, in view of Czaja in view of the Zhou, et al., *Measurement of upper airway movement by acoustic reflection*; Annals of Biomedical Engineering, Vol. 23, No. 1, pp. 85-94 (herein, "Zhou")..

Applicant responds to each of these rejections in the order presented in the Office Action.

I. Rejection of Claims 13 is moot in light of Cancellation of Claim.

In the most recent action, Claim 13 was rejected under Section 101 as being directed to non-statutory subject matter. Claims 13 and 14 have been canceled, herein rendering this rejection moot.

II. Claims 1-8, 11, 13 and 14 are Not Obvious in view of the teachings of Sexton et al, US Patent 6,567,686 in view of Czaja et al,

Claims 1-8, 11, 13 and 14 stand rejected under Section 103(a) as obvious by Sexton in view of Czaja.

Applicant respectfully traverses each and every aspect of this rejection.

It is respectfully submitted that the cited references, alone or in combination, do not disclose a method for predicting the tendency of inhaled particles to deposit within a first patient's throat when said particles are inhaled through an airway defined by the first patient's throat, said method comprising, determining at least one internal physical parameter of said airway defined by the first patient's throat by means of acoustic imaging of the airway defined by the first patient's throat; and matching said at least one internal physical parameter of the airway of the first patient's throat with a dataset comprising pre-determined data relating to the corresponding internal physical parameter for the throat of at least one other patient, wherein said dataset also comprises pre-determined data relating to the tendency of said inhaled particles to deposit within the at least one other patient's throat, and said matching thereby enables prediction of the tendency for the inhaled particles to deposit within the first patient's throat.

In particular, Sexton fails to disclose "a method for predicting the tendency of inhaled particles to deposit within a first patient's throat when said particles are inhaled through an airway defined by said first patient's throat".

Sexton discloses (column 8, line 65 – column 9, line 56)

“ It is therefore an object of the present invention to provide a method for using a dynamic real-time imaging technique to identify and measure geometric, spatial and anatomical changes in the oropharynx, trachea and/or upper regions of the lungs during aerosol medicament administration.

It is therefore a further object of the present invention to provide a method for measuring inhalation flow rate contemporaneous with a temporal real-time imaging technique that identifies and measures geometric, spatial, and anatomical changes in the oropharynx, trachea and/or upper regions of the lungs during aerosol medicament administration to the body.

It is therefore a still further object of the present invention to use the inhalation flow rate and measured geometric, spatial, and anatomical changes in the oropharynx, trachea and/or upper regions of the lungs during aerosol medicament administration to establish a data base which can yield design criteria for efficient drug delivery.

It is therefore a still further object of the present invention to use the inhalation flow rate and measured geometric, spatial, and anatomical changes in the oropharynx during aerosol administration to establish a data base which can yield an aerosol administration procedure that is insensitive to the gag and cough reflexes so that aerosolized medicament exiting an aerosol generator effectively escapes the filtration and swallowing mechanisms of the oropharynx.

To attain the objects described, there is provided a method comprising the use of magnetic resonance imaging (MRI) where a magnet creates a static magnetic field sufficient to extend along the long (mouth-to-larynx) axis of the patient's head. The method can also be used to produce images in the upper regions of the lungs and the lower trachea.

Because different types of tissues have different proton densities, different tissue types in the oropharynx, trachea, and lungs will have different image intensities, and therefore appear as distinct structures in the MR image. When this is coupled with the rapid rate at which images are captured, it is evident that the present inventive method provides for the capture of the real-time mobility of these structures during aerosol administration.

The present method also provides flow rate data on medicament administered based upon pressure changes within a testing mouthpiece. The pressure change data is gathered contemporaneous with the capturing of real-time MR images.

The present inventive method enhances understanding of impaction, filtration, and oropharyngeal deposition of inhaled drugs thus allowing quantitation of drug dosimetry based upon geometric and spatial configuration of the larynx/hypopharynx in the anterior-posterior (AP) as well as the cranio-caudal direction during aerosol administration. This method could be further enhanced to evaluate differences between genders, age groups, and healthy volunteers versus patients. This new understanding of the delivery is used to establish a data base of aerosol administration establishing a criteria that can be used to optimize drug delivery to the lungs through better design of delivery devices.”

Hence, all of the embodiments of Sexton, either prophetic or actual, deal solely with measuring data and creating a database from the data. They do not disclose a method of predicting the tendency of inhaled particles to deposit within a first patient's throat.

Applicant's claimed invention is not obvious in over the combination of Czaja and Sexton as such a combination fails to teach a method of predicting the tendency of inhaled particles to deposit within a first patient's throat.

Sexton also fails to disclose:

“determining at least one internal physical parameter of said airway defined by the first patient's throat by means of acoustic imaging of the airway defined by the first patient's throat; and matching said at least one internal physical parameter of the airway of the first patient's throat with a dataset comprising pre-determined data relating to the corresponding internal physical parameter for the throat of at least one other patient,”

In the Office Action, it is suggested that such a process is disclosed at column 9, lines 50-56 of Sexton, however, these lines disclose no such process. Sexton merely discloses that:

This method could be further enhanced to evaluate differences between genders, age groups, and healthy volunteers versus patients. This new understanding of the delivery is used to establish a data base of aerosol administration establishing a criteria that can be used to optimize drug delivery to the lungs through better design of delivery devices.

Sexton speculates that the database could be used to evaluate differences between individuals. This is fundamentally different to matching a measured parameter of a first patient with a dataset comprising pre-determined data relating to the corresponding internal physical parameter for the throat of at least one other patient.

In short, Sexton only teaches the creation of a database using MRI, and does not teach use of the database to predict the characteristics of a new patient (not on the database).

Hence, even if the skilled person were to replace the MRI of Sexton with the acoustic measurement technique of Czaja; he would not arrive at our

claimed invention. The substitution of the MRI (Sexton) with acoustic measurement (Czaja) would simply create a database of acoustic data, instead of a database of MRI data. Such a database is no closer to Applicant's claimed invention than Sexton in isolation.

Applicant also notes that Sexton was first filed in April of 2000. The disclosure of Czaja was made some 5 years previously, and is acknowledged, measurement of airway cross-sectional area (CSA) was introduced in 1977 (paragraph 1, page 504). Hence the person skilled in the art was aware of acoustic imaging at the time the Sexton application was filed but MRI was used instead, with no teaching of acoustic measurement as an alternative. In fact, Sexton discloses that other measurement techniques were discounted in favor of MRI (column 2, lines 7-27). All this teaches away from the substitution of MRI data by acoustic data.

For at least the reasons set out above, Claim 1 in its present state is patentable over the teachings of Sexton and Czaja. As Claims 2-7 are dependent on Claim 1, Applicant's assert that these Claims are also patentable over Sexton and Czaja for the reasons mentioned above.

Claim 11 also recites assembling a database, determining at least one internal parameter of the airway, and matching at least one internal physical parameter of the airway defined by the first throat, Claim 11 is not rendered obvious by Sexton (solely measuring and creating a database) in view of Czaja (acoustic measurement technique) for similar reasons expressed above with regard to the non-obviousness of Claim 1 over these references. Withdrawal of the rejection of Claim 11 is therefore requested.

In light of the cancellation of Claims 13 and 14, the rejection as to these claims is moot.

Applicant's respectfully request a withdrawal of this rejection, and reconsideration of the claims.

Concerning the rejection of Claim 2, Applicant respectfully traverses each and every aspect of this rejection, for the following additional reasons. As set out above, the acoustic rhinometer of Czaja is unsuited for measurement of the oral cavity and is therefore unsuited to measuring a dimension of the throat of a first patient, a requirement of Claim 2. Furthermore, in the event that the skilled person were to adopt the acoustic rhinometer of Czaja for measurement of the oral cavity, an acoustic measuring device suitable for measuring the oral cavity would require occlusion of the mouth, preventing inhalation of particles via an inhaler. Hence, the combination suggested is non-functional. Thus, Applicant asserts that Claim 2 is not obvious by Czaja in view of Sexton. Applicant's respectfully request a withdrawal of this rejection.

Concerning Claim 8, the rejection is traversed additionally as the claim recites,

“A method for predicting the tendency of inhaled particles to deposit within a first patient's throat when said particles are inhaled through an airway defined by said first patient's throat, said method comprising determining at least one internal physical parameter of said airway defined by the first patient's throat by means of acoustic imaging of the airway defined by the first patient's throat; and matching said at least one internal physical parameter of the airway of the first patient's throat with a dataset comprising pre-determined data relating to the corresponding internal physical parameter for the throat of at least one other patient, wherein said dataset also comprises pre-determined data relating to the tendency of said inhaled particles to deposit within said at least one other patient's throat, and said matching thereby enables prediction of the tendency for the inhaled particles to deposit within the first patient's throat, wherein the pre-determined data relating to the corresponding internal physical parameter is collected by use of Magnetic Resonance Imaging (MRI) of the throat airway of the at least one other patient.” (emphasis added)

A person skilled in the art would not apply the MRI method of Sexton to Czaja, which specifically teaches away from the use of MRI to obtain a measurement of CSA. Czaja states at page 504, last paragraph that “use of CT and MRI is expensive and time consuming, and only yields accurate measurements of CSA when the plane of study is perpendicular to the airway” (page 504, last paragraph), and further states that “the ideal method used to

diagnose and evaluate laryngotracheal stenosis should be simple, rapid to perform, and inexpensive, pose no increased risk to the patient, and be conveniently adapted for use in the office setting” (Page 505, paragraph 1).

Hence, applying the MRI method of Sexton to Czaja would increase complexity, and cost, and runs contrary to the teaching of Czaja as a whole.

In any event, Czaja fails to teach the creation of a data set, thus, even in the unlikely event that the skilled person were to add the MRI imaging method, taught by Sexton, to the acoustic imaging method taught by Czaja, the combination would merely provide two methods of imaging the CSA of the airway, and not the method of the claimed invention of Claim 8.

III. The disclosures of Sexton and Czaja further in view of Stapleton et al. do not render Claims 9 and 12 Obvious

Claim 9 depends from Claim 1. Claim 12 depends from independent Claim 11. For the reasons detailed above, Claims 1 and 11 are not rendered obvious by the teachings of Sexton and Czaja. Stapleton does nothing to correct the deficiencies of these references in such an argument, and therefore Claims 9 and 12 are also not rendered obvious in view of these teachings in the art.

Applicant's respectfully request a withdrawal of this rejection.

IV. Claim 10 is non-obvious over the teachings of Czaja and Sexton in view of Zhou.

Claim 10 stands rejected under 35 USC 103(a) as obvious by Czaja and Sexton further in view of Zhou. Applicant respectfully traverses each and every aspect of this rejection for the same reason presented above concerning the rejection of Claim 1.

Stapleton does nothing to correct the deficiencies of Czaja and Sexton.
Applicant's respectfully request a withdrawal of this rejection.

CONCLUSION

In light of the comments and amendments made herein, reconsideration is hereby requested. It is respectfully asserted that the specification and claims are in condition for allowance.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge any fees or credit any overpayment, particularly including any fees required under 37 CFR Sect 1.16 or 1.17, and any necessary extension of time fees, to deposit Account No. 07-1392.

Respectfully submitted,

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Date: September 15, 2009
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